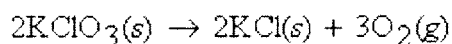


Multiple Choice (6 points each): Please write the letter of the best choice in the blank provided.

1. D A solution is prepared by dissolving 0.0584 mol of Na_2SO_4 in enough water to make 225 mL of solution. Calculate the solution molarity.

A) 0.0584 M
B) 1.87 M
C) 0.603 M
D) ~~0.260 M~~
E) 0.484 M

2. E A 3.1-mol sample of KClO_3 was decomposed according to the equation below. How many moles of O_2 are formed assuming 100% yield?



3.1 mol

A) 2.1 mol
B) 2.6 mol
C) 3.1 mol
D) 1.6 mol
E) 4.7 mol

$$\frac{3.1 \text{ mol KClO}_3}{2 \text{ mol KClO}_3} \times 3 \text{ mol O}_2$$

$$= 4.65 \text{ mol O}_2$$

3. B A solution is prepared by dissolving 20.0 g of potassium nitrate in 125.0 g of water. Calculate the mass percent of potassium nitrate in the solution.

A) 16.0 %
B) 13.8 %
C) 20.0 %
D) 86.2 %
E) 84.0 %

4. D When a solvent has dissolved all the solute it can at a particular temperature, it is said to be
- A) diluted
 - B) unsaturated
 - C) supersaturated
 - D) saturated
 - E) none of these

5. B What is the concentration of bromide ions in a solution that is 0.40 M calcium bromide?
- CaBr_2
 $\begin{array}{l} \times 2 \\ = 0.80 \text{ M} \end{array}$
- A) 0.40 M
 - B) 0.80 M
 - C) 0.20 M
 - D) 1.2 M
 - E) 0.60 M

6. D Refer to the following equation below. How many molecules of water are produced if 9.12 mol of NO_2 is given off?



- A) 1.10×10^{25}
- B) 5.49×10^{24}
- C) 164.2
- D) 8.24×10^{24}
- E) none of these

9.12 mol NO_2	6 mol H_2O	6.022 $\times 10^{23}$ molec
4 mol NO_2	1 mol H_2O	

7. A What volume of 2.00 M sulfuric acid is required to prepare 250. mL of 0.125 M H_2SO_4 ?

- A) 15.6 mL
- B) 64.0 mL
- C) 0.0640 mL
- D) 62.5 mL
- E) 25.0 mL

$$M_1 V_1 = M_2 V_2$$

$$(2.00 \text{ M})(V_1) = (0.125 \text{ M})(250. \text{ mL})$$

$$V_1 = 15.6 \text{ mL}$$

8. (5) Spell Professor Bates's favorite word in chemistry: Stoichiometry

9. (12) What mass of solute is contained in 64.9 mL of a 0.750 M solution of iron(III) chloride?

$$\frac{64.9 \text{ mL}}{1000 \text{ mL}} \times \frac{0.750 \text{ mol}}{1 \text{ mol}} \times \frac{162.2 \text{ g}}{1 \text{ mol}} = \boxed{7.90 \text{ g FeCl}_3}$$

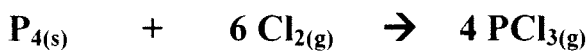


Fe: 55.85 g/mol

Cl: 3 x 35.45 g/mol

162.2 g/mol

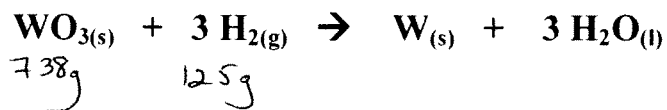
10. (16 points) Complete the following table for the following reaction. Assume 100% yield.
Be sure to indicate + / - in the "moles REACTING" line.



Moles at the START	7	24	0
Moles REACTING	-4	-24	+ 16
Moles at the END	3 mol	0 mol	16 mol

11. (25) Consider the reaction of tungsten (VI) oxide with hydrogen gas below. If 738 g of WO_3 is allowed to react with 125 g of H_2 gas:

- A) What is the limiting reagent? WO_3
 B) What is the theoretical yield (in grams) of free tungsten metal? 585g
 C) What mass of excess reagent remains? 106g H_2



Molar masses (g/mol):

$\text{WO}_3 = 231.84$

$\text{H}_2 = 2.016$

$\text{W} = 183.84$

$\text{H}_2\text{O} = 18.02$

(LR)

738g WO_3	1 mol	1 mol W	183.84g W	= TY = 585g
	231.84g	1 mol WO_3	1 mol W	

125g H_2	1 mol H_2	1 mol W	183.84g	= 3800g
	2.016g H_2	3 mol H_2	1 mol W	

738g WO_3	1 mol WO_3	3 mol H_2	2.016g H_2
	231.84g WO_3	1 mol WO_3	1 mol H_2

= 19.3g reacts

125g start
 - 19.3g reacts

 105.7g = 106g H_2 remains